

affidavits under 37 CFR 1.132 or cite references to show what one skilled in the art knew at the time of filing the application. A declaration or affidavit is, itself, evidence that must be considered.”

In accordance with MPEP § 2164.05, filed herewith are 37 CFR 1.132 affidavits of Pascal Daloz and Francois Perroux.

Mr. Daloz has affirmed, among other things, that: (i) he is the vice-president of research and development in charge of strategy and business development [Daloz affidavit ¶ 1]; (ii) his employment duties includes the hiring and management of engineers working in the computer aided design, manufacturing, and engineering (CAD/CAM/CAE) field [Daloz affidavit ¶ 2]; (iii) the scope of his employment duties includes the hiring of individuals for the design and implementation of CAD/CAM/CAE systems [Daloz affidavit ¶ 2]; (iv) that Mr. Perroux is one of ordinary skill in the technical arts relevant to the design, engineering, and implementation of CAD/CAM/CAE functionality [Daloz affidavit ¶ 5].

Mr. Perroux has affirmed, among other things, that: (i) he is employed in the field of computer aided design, manufacturing, and engineering (CAD/CAM/CAE) system development [Perroux affidavit ¶ 2]; (ii) he has reviewed pending claims 25, 27-28, 30-31, 33-36, and 38 of U.S. Patent application No. 09/329,339 [Perroux affidavit ¶ 3]; (iii) he has reviewed the specification of U.S. Patent application No. 09/329,339 as filed with the United States Patent and Trademark Office on June 10, 1999 [Perroux affidavit ¶ 3]; (iv) the specification of U.S. Patent application No. 09/329,339 as filed with the United States Patent and Trademark Office on June 10, 1999 is sufficient to enable the implementation of the inventions recited in pending claims 25, 27-28, 30-31, 33-36, and 38 at the time of filing of the Specification [Perroux affidavit ¶ 5].

Each of the Examiner’s rejections under 35 U.S.C. 112 ¶ 1 is respectfully traversed. As affirmed by Mr. Daloz, Mr. Perroux is one of “ordinary” skill in the art to which the present inventions pertain (i.e., the design and implementation of CAD/CAM/CAE functionality) [Daloz affidavit ¶ 4]. With regard to this “ordinary” skill level, the Examiner should recognize that the inventions claimed herein are in a highly

specialized and complex CAD/CAM/CAE technical field where even an “ordinary” skill level requires an advanced understanding of, and advanced skills in, sophisticated mathematical and engineering concepts.

Further, as shown by the affidavit of Mr. Perroux, the specification of the present application is sufficient to enable one skilled in the such subject matter at the time of filing of the Specification to make and/or use the invention. Based on the foregoing affidavits, there is no objective reason for the Examiner to maintain his rejections of claims under 35 U.S.C. 112 ¶ 1 and the undersigned respectfully request that these rejections be withdrawn. Further, it is well settled that “enablement” does not require perfect clarity and, in fact, an “enabled” application may be one that requires one skilled in the art to engage in additional experimentation to implement the invention. See MPEP § 2164.06.

5.1 Claim 25 includes the following limitations in-part:

determining a subset of the polygons such that each polygon in said subset has a trajectory through its corresponding second zone during motion of the modeled object from a preceding position to a current position and from the current position to a next position

The Examiner is referred to [Perroux affidavit ¶ 12]. As affirmed by Mr. Perroux, the Specification provides sufficient disclosure to enable one of ordinary skill in the arts to which this invention pertains to make and use the claimed invention. In particular, Mr. Perroux has affirmed that Specification disclosure found at page 9 ¶ 3 and in Fig. 10 is sufficient to enable one to make and use this element of the claim. See also [Perroux affidavit ¶ 17].

where each such polygon's second zone comprises a zone represented by a half sphere, said half sphere comprising a flat face that is planar with said polygon and said half sphere extending interior to the modeled object [lines 16-22; emphasis added];

The Examiner is referred to [Perroux affidavit ¶ 13]. As affirmed by Mr. Perroux, the Specification provides sufficient disclosure to enable one of ordinary skill in the arts to which this invention pertains to make and use the claimed invention. In particular, Mr. Perroux has affirmed that Specification disclosure found at page 7 line 3 to 6, 18 to 20, and in Fig. 7, which shows a half sphere 510 with a flat face planar with the illustrated

polygon and extending interior to the modeled object is sufficient to enable one to make and use this element of the claim. See also [Perroux affidavit ¶ 17].

constructing a representation of the swept volume from the generated traces of the motion of the subset of edges, wherein constructing a representation of the swept volume further comprises bounding the swept volume at each of said current positions in said series by said subset of polygons associated with each such current position" [lines 25-29].

The Examiner is referred to [Perroux affidavit ¶ 15]. As affirmed by Mr. Perroux, the Specification filed June 10, 1999 provides sufficient disclosure to enable one of ordinary skill in the arts to which this invention pertains to make and use the claimed invention. In particular, Mr. Perroux has affirmed that Specification disclosure found at page 9 ¶ 2 is sufficient to enable one to make and use this element of the claim. See also [Perroux affidavit ¶ 17].

The concept of bounding the swept volume at each of the current positions in the series by said subset of polygons associated with each such current position is understood. However, the concept of *a polygon in the subset having a trajectory through a second zone* during motion of the modeled object from a preceding position to a current position or from the current position to a next position, where such polygon's *second zone comprises a zone represented by a half sphere*, the half sphere comprising a flat face that is planar with the polygon and *the half sphere extending interior to the modeled object* is conceptually impossible and appears to be incorrect. How the polygon will execute such trajectory *through a second zone represented by a half sphere extending interior to the modeled object* during its motion has not been properly explained in the specification. It is impossible to understand how a polygon, e.g. a triangle, a rectangle or a hexagon will execute a trajectory *through a half sphere extending interior to the modeled object* and be part of the boundary of the swept volume. For example, when a book is rotated about an axis the end rectangles produce half cylinders, which are not entirely within the material of the object. The applicants have failed to provide proper explanation in the specification making it impossible for one of ordinary skill in the art to make and use the system.

The Examiner's rejection is respectfully traversed. In accordance with MPEP § 2164.05, the affidavit of Mr. Perroux provides sufficient evidence to overcome the Examiner's rejection.

While the affidavit of Mr. Perroux shows that one of "ordinary" skill in this complex area would know how to make and use the invention, it is recognized that, due to the complexities inherent in this field, the Examiner may require further explanation to understand the claimed invention. The following explanatory text is intended to assist the Examiner in this regard. If the Examiner feels that this explanation is insufficient, a telephone conference with Mr. Perroux and/or the inventors can be provided for further clarification.

A first concept that would be understood by one of "ordinary" skill in the relevant arts based on the Specification's disclosure is that a swept volume is a "space reservation." That is, a swept volume model represents a space traversed during movement of an object. The swept volume is not, in and of itself, comprised of physical material (though physical parts do move within the modeled volume and contribute to the modeled shape of the swept volume). Generally speaking, the application of calculating a swept volume is to define a spatial reservation. This special reservation may be used to determine whether moving objects will collide with other objects.

A second concept that would be understood by one of "ordinary" skill in the relevant arts based on the Specification's disclosure is that the concept expressed in the disclosure does not require movement of polygon "faces" inside matter -- it being understood that objects, themselves, would generally be non-deformable. The movement of "faces" inside matter is a conceptual test of a direction of movement to check whether a particular surface, when moving, will create an outside boundary of the swept volume, or conversely will not "expand" this volume and then be discarded by the algorithm.

These concepts are illustrated in Fig. 7. For sake of this explanation, consider the polygon in the lower-left of the figure and assume the faces are numbered 630-635 (where face 630 corresponds to the position of face 630 in Fig. 6 and the 5 other faces are numbered counting clockwise from face 630, as 631 to 635). Taking face 630, and applying to this face a movement defined by vector 711, when movement vector 711 is applied face 630 moves in a direction that is towards or "into" the matter of the polygon. Face 630 does not actually occupy space "inside" the matter of course, as the whole object also moves, and is not deformed -- the focus here is on the direction of movement. In this case, i.e., when the direction of movement is toward the material of the object, the algorithm will keep this surface as contributing to defining the whole swept volume (refer also to Figs. 8 and 9 which shows the swept volume as it is being defined). Face 631 will similarly contribute to the swept volume envelope.

In contrast, consider the application of the 711 translation to face 632 (top horizontal face). When 711 is applied to face 632, face 632 moves in a direction "out" or

away from the material of the object. This face will be discarded (or "filtered" as explicitly mentioned on page 2 ¶ 5, bottom of page 7 and top of page 8, or implicitly on page 6 ¶ 2), and will not contribute to the definition of the swept volume. This accelerates the swept volume construction process (as explicitly mentioned on page 8 ¶ 1 of the Specification). Faces 633, 634 similarly move "out" or away from the material object and are not included in the swept volume, while face 635 moves "into" the material and is included. The foregoing calculations are repeated at each of a series of positions used to approximate movement between a beginning and an end point.

5.2 Claim 31 includes the following limitations in-part:
a subset of the polygons is determined such that each polygon in said subset has a trajectory through its corresponding second zone during motion of the modeled object from a preceding position to a current position and from the current position to a next

* * *

The applicants have failed to provide proper explanation in the specification making it impossible for one of ordinary skill in the art to make and use the system.

The Examiner's rejection of claim 31 is substantially identical to the Examiner's rejection of claim 25. The Examiner is referred to the remarks presented above with respect to claim 25 and to Mr. Perroux's affidavit affirming that the Specification is sufficient to enable one skilled in the art at the time of filing of the application to make and use the claimed invention. See [Perroux affidavit ¶ 21]. Accordingly, the examiner's rejection of claim 31 is traversed for substantially the same reasons set forth with respect to claim 25.

5.3 Claim 35 includes the following limitations in-part:
determining a subset of the polygons such that each polygon in said subset has a trajectory through its corresponding second zone during motion of the modeled object from a preceding position to a current position and from the current position to a next

* * *

The applicants have failed to provide proper explanation in the specification making it impossible for one of ordinary skill in the art to make and use the system.

The Examiner's rejection of claim 35 is substantially identical to the Examiner's rejection of claim 25. The Examiner is referred to the remarks presented above with respect to claim 25 and to the Mr. Perroux's affidavit affirming that the Specification is sufficient to enable one skilled in the art at the time of filing of the application to make and use the claimed invention. See [Perroux affidavit ¶ 25]. Accordingly, the examiner's

rejection of claim 35 is traversed for substantially the same reasons set forth with respect to claim 25.

5.4 Claim 36 includes the following limitations in-part:

determining a subset of the edges such that each edge in said subset has a trajectory through its corresponding second zone during motion of the modeled object from a preceding position to a current position and from the current position to a next position

* * *

The applicants have failed to provide proper explanation in the specification making it impossible for one of ordinary skill in the art to make and use the system.

The Examiner's rejection of claim 36 is substantially identical to the Examiner's rejection of claim 25 (with the primary differences in the Examiner's language tracking differences in the claim language that sets forth a reduced dimensionality for the claimed invention (i.e., claim 36 is directed to 2D features, while claim 36 is directed to 3D). The Examiner is referred to the remarks presented above with respect to claim 25 and to the Mr. Perroux's affidavit affirming that the Specification is sufficient to enable one skilled in the art at the time of filing of the application to make and use the claimed invention. See [Perroux affidavit ¶ 25]. The examiner's rejection of claim 35 is traversed for substantially the same reasons set forth with respect to claim 25.

REQUEST FOR INTERVIEW

If the Examiner finds the submitted affidavits insufficient to overcome the rejections, then an interview with the Examiner is respectfully requested prior to issuance of a further Office Action.

CONCLUSION

No claims have been canceled or amended. Claims 25, 27, 28, 30, 31, 33-36, and 38 remain pending and believed to be in condition for allowance. Applicant respectfully requests that all pending claims be allowed.

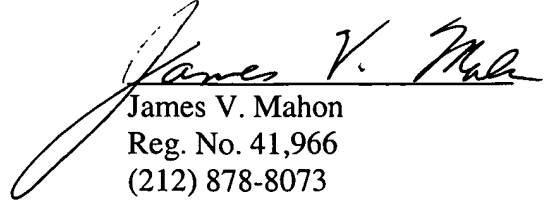
Please apply any credits or excess charges to our deposit account number 50-0521.

Respectfully submitted,

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